Alliance Learning Collaborative: Leveraging Home Health and Mobile Technologies to Reduce Readmissions

February 11, 2015
About the Alliance

• 501(c)(3) non-profit research foundation

• Mission: To support research and education on the value home health care can offer to patients and the U.S. health care system. Working with researchers, key experts and thought leaders, and providers across the spectrum of care, we strive to foster solutions that will improve health care in America.

• [www.ahhqi.org](http://www.ahhqi.org)
Using mobile technology to support *quality improvement*, *interoperability*, and *sustainability* for home care

Andrey Ostrovsky, MD
CEO | Co-Founder | Care at Hand
andrey@careatHand.com
In everything we build, we believe in reimagining a world where the elderly and people with disabilities thrive in their homes rather than wither in hospitals.
Causes of wasteful spending

<table>
<thead>
<tr>
<th>Causes of Waste in US Health Care Spending in 2011, by Category</th>
<th>Cost to Medicare and Medicaid</th>
<th>Total cost to US health care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Midpoint</td>
</tr>
<tr>
<td>Failures of care delivery</td>
<td>$26</td>
<td>$36</td>
</tr>
<tr>
<td>Failures of care coordination</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>Overtreatment</td>
<td>67</td>
<td>77</td>
</tr>
<tr>
<td>Administrative complexity</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>Pricing failures</td>
<td>36</td>
<td>56</td>
</tr>
<tr>
<td>Subtotal (excluding fraud and abuse)</td>
<td>166</td>
<td>235</td>
</tr>
<tr>
<td>Percentage of total health care spending</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>Fraud and abuse</td>
<td>30</td>
<td>64</td>
</tr>
<tr>
<td>Total (including fraud and abuse)</td>
<td>197</td>
<td>300</td>
</tr>
<tr>
<td>Percentage of total health care spending</td>
<td>21%</td>
<td>34%</td>
</tr>
</tbody>
</table>


Notes: Dollars in billions. Totals may not match the sum of components due to rounding. *Includes state portion of Medicaid. †Total US health care spending estimated at $2.687 trillion.
Poor care coordination reflected by readmissions

1 in 5 Medicare patients are readmitted every month

1 in 4 Duals are readmitted every month

80 percent of serious medical errors involve miscommunication during the hand-off between medical providers (1)

Breakdown in communication leading root cause of sentinel events reported to The Joint Commission between 1995 and 2006 (2)

11% of 30,000 preventable adverse events that led to permanent disability in Australia were due to communication issues (3)

Care transition programs can effectively improve communication and reduce avoidable admissions (4)

Affordable Care Act penalizing avoidable readmissions
ACA also creating positive incentives

- Duals Demonstration Projects
- Community Based Care Transitions Program

- Payer
  - Hospital
  - Acute Rehab
  - Long term hospital
  - SNF
  - Assisted Living
  - PCP
  - VNA
  - Home Health
  - CBOs
  - Family
  - Patient at home
ACA forcing a shift toward less expensive care transition models

- Readmission reduction program
- Value-based purchasing program
- Medicare Shared Savings
- Bundled payments
- Duals demonstration program
- Community based care transitions program
- Medicaid Waivers
- Money follows the person
- Community First Choice
- Chronic Care Management
- Balanced improvement program
- State innovation models
Cost of care transitions program needs to be $250 or less.
Guided Care

$1,732 per consumer per year

Geriatric Resources for Assessment and Care of Elders (GRACE)

$1,432 per consumer per year
Transitional Care Model
(Naylor Model)

$982 per consumer per year

Care Transitions Intervention (Coleman Model)

$196+ per consumer per year
Health Coach is a Nurse

Care coordination
Care management
Med rec
Red flags education

For 800 patients per month, need *32 nurses ($45-70k/yr)

*Interview with Dr. Eric Coleman: http://www.modernhealthcare.com/article/20100816
Health Coach  Nurse Care Coordinator

Care Coordination
Med rec
Red flags education
f/u appointments

Care management
Health Coach  Nurse Care Coordinator

Same community
Same education level
Same language
Same cultural background

Care Coordination
Med rec
Red flags education
f/u appointments

Care management
Communication with physicians
Triage
Sick vs Not Sick
Education of coach
For 800 patients per month, need 20 health coaches ($30k/yr) + 1 nurse*

*Admin staff is an essential component of a successful program
Private duty/PCA Staff

- Same community
- Same education level
- Same language
- Same cultural background

Care Coordination
- Med rec
- Red flags education
- f/u appointments

Skilled staff

Care management
- Communication with physician
- Triage
- Sick vs Not Sick
- Education of coach
1,064 alerts had response from nurse care manager

822 care management episodes with no subsequent readmission within 30 days of hospital discharge

242 care management episodes followed by subsequent readmission within 30 days of hospital discharge

1,202 alerts generated by Care at Hand in response to submitted surveys

32 alerts that did not have any response from nurse care manager

106 alerts couldn’t be reconciled between administrative data and Care at Hand data

5,224 surveys performed using Care at Hand (2,027 unique patients)

1,202 alerts generated by Care at Hand in response to submitted surveys

1,064 alerts had response from nurse care manager

567 episodes had a subsequent Care at Hand survey (avg 11 days after prior survey)

77 episodes had a readmission more than 30 days after the hospital discharge (avg 141 post-discharge)

19 episodes had a subsequent readmission for an observation stay within 30 days of hospital discharge

522 alerts couldn’t be reconciled between administrative data and Care at Hand data

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77 episodes had a readmission more than 30 days after the hospital discharge (avg 141 post-discharge)

19 episodes had a subsequent readmission for an observation stay within 30 days of hospital discharge

159 episodes were the last touch point in the transition program (avg 26 days post-discharge)
Risks for readmission

- **Intrinsic (3)**
  - Medical or surgical condition
  - Mental or behavioral problem
  - Functional decline

- **Extrinsic (21)**
  - Environmental (7 domains)
  - Care coordination breakdowns (14 domains)
<table>
<thead>
<tr>
<th>Intrinsic</th>
<th>Extrinsic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worsening medical or surgical condition (i.e., chest pain, shortness of breath, etc)</td>
<td>Management of a specific condition</td>
</tr>
<tr>
<td>Worsening mental or behavioral health problem (i.e., depression, noncompliance, etc)</td>
<td>Setting up PCP or specialist appointment</td>
</tr>
<tr>
<td>Functional decline (i.e., needs help with more ADLs, worsening frailty, etc)</td>
<td>Coordination issue remained unresolved (Loop not closed)</td>
</tr>
<tr>
<td></td>
<td>Skilled home care assessment, referral, or service</td>
</tr>
<tr>
<td></td>
<td>Non-skilled home care assessment, referral, or service</td>
</tr>
<tr>
<td></td>
<td>Behavioral health assessment, referral, or service</td>
</tr>
<tr>
<td></td>
<td>Home safety assessment</td>
</tr>
<tr>
<td></td>
<td>Other home and community services based assessment, referral, or service</td>
</tr>
<tr>
<td></td>
<td>Medications ordered and filled</td>
</tr>
<tr>
<td></td>
<td>Medication reconciliation</td>
</tr>
<tr>
<td></td>
<td>Ongoing medication management in the home (filling syringes, applying creams, etc)</td>
</tr>
<tr>
<td></td>
<td>Durable medical equipment (DME) ordered and filled</td>
</tr>
<tr>
<td></td>
<td>Inadequate family or community support to help with function</td>
</tr>
<tr>
<td></td>
<td>Patient or family education or health literacy</td>
</tr>
<tr>
<td></td>
<td>Financial insecurity (i.e., can't afford basic necessities)</td>
</tr>
<tr>
<td></td>
<td>Food insecurity (i.e., lack of access to high quality nutrition)</td>
</tr>
<tr>
<td></td>
<td>Housing insecurity (i.e., risk of homelessness)</td>
</tr>
<tr>
<td></td>
<td>Housing quality (i.e., bug or rodent infestations, elevator out, no heat, appliance not working, etc)</td>
</tr>
<tr>
<td></td>
<td>Violence or abuse</td>
</tr>
<tr>
<td></td>
<td>Transportation (i.e., can't get to appointments, etc)</td>
</tr>
<tr>
<td></td>
<td>Legal</td>
</tr>
</tbody>
</table>
Intrinsic and extrinsic readmission risk factors overlap

- Intrinsic & Extrinsic Environmental (2%)
- Intrinsic & Extrinsic Care Coordination (21%)
- Extrinsic Care Coordination (12%)
- Other (3%)
- Intrinsic (62%)
Nurse-only models do not address all risks for readmission

- Intrinsic: Functional decline (ie needs help with
- Extrinsic: Care Coordination Deficit: Setting up PCP
- Extrinsic: Care Coordination Deficit: Medications
- Extrinsic: Care Coordination Deficit: Ongoing
- Extrinsic: Care Coordination Deficit: Inadequate
- Extrinsic: Care Coordination Deficit: DME ordered
- Extrinsic: Environmental: Housing quality (Bug or
- Extrinsic: Environmental: Violence/abuse
- Extrinsic: Care Coordination Deficit: Home safety
- Extrinsic: Environmental: Legal
- Extrinsic: Care Coordination Deficit: Other home
Impact of nurse transition coach

- Intrinsic: Functional decline (i.e., needs help with)
- Extrinsic: Care Coordination Deficit: Setting up PCP
- Extrinsic: Care Coordination Deficit: Medications
- Extrinsic: Care Coordination Deficit: Ongoing
- Extrinsic: Care Coordination Deficit: Inadequate
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  - Extrinsic: Environmental: Violence/abuse
- Extrinsic: Care Coordination Deficit: Home safety
  - Extrinsic: Environmental: Legal
- Extrinsic: Care Coordination Deficit: Other home

Nurse is transition coach
Gap remains even when nurse and coach roles are separate

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Extrinsic: Care Coordination Deficit: Other home

Coach is a Community Health Worker
Nurse oversight over community health workers necessary to tap full potential of “mHealth Transitions Model”

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Coach is a Community Health Worker
What we do

Smart surveys that accurately predict hospitalizations using observations of non-clinical workers

Survey library
Expert-informed, Psychometrically validated, Field tested

Risk prediction algorithms
Evidence-based, Statistically significant, Inputs: non-clinical observations

Analytics
Must-have data with most granular leading indicators in the market

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Before Care at Hand – communication breakdowns between nurse and nonclinical coach

Customers pay for and underutilize 5 million non-clinical workers in attempting to reduce $250 BILLION in avoidable costs.
Alerts triggered by Care at Hand technology

Digitizing the “hunch” of non-clinical workers to detect early decline

Private duty/PCA staff

Nurse Care Coordinator

Emergency Dept/Admission

Primary Care Provider Visit

Home Visit by Nurse

Care coordination
Over the past month, has the client had more difficulty paying for their food than most other months?

Yes  No

Does the client have a fever or feel more warm today compared to most other days?

Yes  No

Did the client sleep on more pillows last night than most other nights?

Yes  No
Solution

Analytics beyond the smart surveys

1. Continuous Risk Prediction **sheds light on admissions** in blind spot between doctor visits

2. Hotspotting enables **precisely targeted**, **more cost-effective**, patient-centered interventions

3. Quality measurement data offers must-have, **most granular leading indicators** in the market

4. Workforce measurement and motivation eliminates high turnover rates

US Patent Serial No. 61/936459

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Non-clinical workers reduce costs, predict readmissions

AHRQ. Service Delivery Innovation: Community-Based Health Coaches and Care Coordinators Reduce Readmissions Using Information Technology To Identify and Support At-Risk Medicare Patients After Discharge. Rockville, MD. 2014.

- Estimated Net Savings
  - Total Cost of Care Coordination
  - Total Technology + Training Cost
  - Savings from prevented admissions
  - Net Savings

- $39.6% 30 day readmissions
- $109 savings per member per month
- $2.54 net savings for every $1 invested

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Nurse input improves prediction of 30-day readmission risk

**Diagram:**

- **Legend:**
  - Alert-based Risk Score
  - Intervention-based Risk Score (Unstructured data)
  - Intervention-based Risk Score (Structured data)

**Graph:**

- **Y-axis:** 30 day readmission rate
- **X-axis:** Risk category (Baseline, Mild, Moderate, High)

The graph shows a comparison of readmission rates across different risk categories for alert-based and intervention-based risk scores. Nurse input significantly improves the prediction of 30-day readmission risk.
mHealth + non-clinical staff input + nurse oversight predict 120-day readmission
Skilled nursing involved in over 40% of care coordination episodes
Understanding the distribution of costs will help identify where to look for savings opportunities.

**Chart 1:** Percent of Spending by Episode Type, 30-day Fixed-length Episodes, 2007-2009

A readmission can more than double the episode cost.

**Chart 6:** Cost of a 30-day Fixed-length Episode with and without a Readmission, 2007-2009

- **No Readmission**
- **Readmission**

<table>
<thead>
<tr>
<th>DRG Code</th>
<th>No Readmission</th>
<th>Readmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-DRG 247</td>
<td>$23,527</td>
<td>$32,262</td>
</tr>
<tr>
<td>MS-DRG 470</td>
<td>$18,128</td>
<td>$29,803</td>
</tr>
<tr>
<td>MS-DRG 481</td>
<td>$23,034</td>
<td>$32,262</td>
</tr>
<tr>
<td>MS-DRG 192</td>
<td>$5,514</td>
<td>$14,977</td>
</tr>
<tr>
<td>MS-DRG 194</td>
<td>$8,492</td>
<td>$19,243</td>
</tr>
<tr>
<td>MS-DRG 291</td>
<td>$12,075</td>
<td>$23,844</td>
</tr>
</tbody>
</table>

247: Percutaneous cardiovascular procedure with drug-eluting stent w/MCC
470: Major joint replacement or reattachment of lower extremity w/o MCC
481: Hip & femur procedures except major joint w/CC
192: Chronic obstructive pulmonary disease w/o CC/MCC
194: Simple pneumonia & pleurisy w/CC
291: Heart failure & shock w/MCC

Efficiently innovating with new delivery models

- No evidence
- Quality Improvement
- Evidence-based practice
Rapid Cycle Testing – Quality Improvement

Quality Improvement

- Aim
- Measurement
- Drivers

Adapted from Langley et al. The Improvement Guide

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Why is rapid cycle testing so important?
Why is rapid cycle testing so important?
Get to more sales or better outcomes faster and cheaper
<table>
<thead>
<tr>
<th>Aim Statement</th>
<th>Primary Drivers</th>
<th>Secondary Drivers</th>
<th>Change Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help AAA</td>
<td>increase hospital-based revenue by 20%</td>
<td>by providing care transitions services at ½ the cost of traditional transition services</td>
<td>within 6 months</td>
</tr>
</tbody>
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Aim Statement

Help AAA | increase hospital-based revenue| by 20% | by providing care transitions services | at ½ the cost of traditional transition services | within 6 months

Primary Drivers

Showing value to hospitals

Secondary Drivers

Providing transitions at lower cost than hospitals

Change Strategies

Add new Aim
Add new Primary Driver
Add new Secondary Driver
Add new change strategy
Aim Statement: Help AAA increase hospital-based revenue by 20% by providing care transitions services at \( \frac{1}{2} \) the cost of traditional transition services within 6 months.

Primary Drivers:
- Showing value to hospitals
- Providing transitions at lower cost than hospitals

Secondary Drivers:
- Not enough business acumen
- No way to measure impact of transition program in real time
- No trust from hospitals
- No published data to show hospitals AAA impact
- Not enough experience doing transitions using non-clinical staff

Change Strategies:
- Add new Aim
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Change Strategies

Bootcamp and ongoing TA for biz acumen

Use Care at Hand QI Dashboards and PDSA Wizard

Submit for case studies like AHRQ innovations exchange, etc

Bootcamp and ongoing TA on QI

Real-time identification of knowledge deficits

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- [COMPLETED – Scaled] Submit for case studies like AHRQ innovations exchange, etc

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Analytics to measure QI performance – use this to close deals

Aim - Who's problem

- AAA: 31%
- Hospital: 61%

Secondary Driver - STAR Category

- Care Coordination: 25%
- Getting Needed Care: 25%
- Health Plan Quality Improvement: 8%
- Improving or Maintaining Mental Health: 34%

Aim - What Problem

- Improve MU2 compliance: 31%
- 8%
It's not about QI or readmissions...

...it's about the community and aging in place
Thank you!

Andrey Ostrovsky, MD
CEO | Co-Founder, Care at Hand
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